INSTRUCTION MANUAL

32336

EMPIRE*

REMOTE VERTICAL ANTENNA

MODEL VR-105

SERIAL NO.

Gertsch*
EMPIRE*
Sensitive Research*
Panoramic*
SINGER

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Precision electrical and electronic instruments for measurement

THE SINGER COMPANY • METRICS DIVISION

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THE SINGER COMPANY, METRICS DIVISION, warrants each new instrument to be free from defects in material and workmanship, effective after delivery to the original purchaser as follows:

*Commander** Instruments: Potentiometers, Bridges, Volt Ratio Boxes and Standard Resistors.....5 years

*Sensitive Research** Electrical Indicating Instruments.....2 years

Other Electrical and Electronic Measuring Instruments.....1 year

Repair or replacement (at our option) without charge (F.O.B. factory) will be effected when our examination satisfactorily indicates that defects are due to workmanship or materials. Electron tubes, semiconductors, batteries, fuzes, lamps, thermoelements, and *RatioTran** potentiometers are excluded from warranty coverage. Warranty returns must first be authorized by the factory.

If the instrument or any portion thereof, has been abused, misused, damaged by accident or negligence, or if any serial number or seal has been removed or altered, the warranty is void.

This warranty is in lieu of all other obligations or liabilities expressed or implied and The Singer Company neither assumes, nor authorizes any person to assume for them, any other liability in connection with sales of instruments manufactured by The Singer Company, Metrics Division.

THE SINGER COMPANY • METRICS DIVISION

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REPAIR AND MAINTENANCE

Instruments should be returned only on prior written authorization from the Singer Representative or the factory(1). Warranty repair will be made upon written request. Please provide the following information in order to expedite our processing of your instrument:

1. Model or Type
2. Serial Number
3. Description of trouble(2)
4. Test instruments used
5. Approximate date instrument was placed in operation
6. Approximate number of hours of use
7. Has maintenance action been previously requested?
8. Other comments

Upon receipt of this information our Service Department will send you service data or shipping instructions. Upon receipt of shipping instructions forward the instrument to the factory prepaid. If requested, an estimate of charges will be made before work begins.

(1) Contact Metrics Division, Bridgeport, Connecticut for *Commander**, *Empire**, *Panoramic**, and *Sensitive Research** instruments. Contact Metrics Division, Los Angeles, California for *Gertsch** instruments.

(2) Include data on symptoms, measurements taken, suspected location of trouble, maintenance action taken, and any other relevant data.

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1. GENERAL

Remote Vertical Antenna Model VR-105 is designed as an optional antenna accessory to Tuning Unit TX/NF-105.

It enables the Noise and Field Intensity Meter NF-105 and its operator to be clear of the source of interference by as much as 30 ft., thus improving the measurement accuracy. It covers the full frequency range of the tuning unit (14 KC to 150 KC) in one band by the use of a single broadband impedance matching coupler.

This antenna consists of a base, mounting ring, adapter and either a 41 inch rod or a 9 ft. rod. The mounting ring has three quick disconnect fasteners for securing the VR-105 to the Broadband Antenna Plane which is part of Broadband Antenna Model BB-105. The adapter enables the 9 ft. rod to be used with the base instead of the 41 inch collapsible rod.

The remote vertical antenna, when used with the 41 inch collapsible rod is referred to as VR-1-105, and when used with the adapter and the 9 ft. rod it is referred to as VR-3-105. The antenna factors covering both the VR-1 and VR-3 are published in the instruction manual for the TX/NF-105 on page 16. The antenna factors are required when making radiated measurements, using shunt calibration. The antenna factors are not required when making broadband radiated measurements using series calibration.

2. INSTALLATION

The remote vertical antenna VR-105 is normally mounted on the Broadband Antenna Plane, as shown in fig. 1.

To mount the VR-105 base on the broadband antenna ground plane, proceed as follows:

Holding the mounting ring, lower the base through the 5-1/4" center hole in the BB-105 ground plane. Secure the three half-turn fasteners. It is possible that older models of the BB-105 ground plane do not have the 5-1/4" clearance hole. In this case it is necessary to enlarge the existing hole, which may be accomplished using a jig saw or fly-cutter. If a BB-105 ground plane is not available, a suitable ground plane may be made from an aluminum sheet of 24" x 24" x 3/32" thick. A drilling template (fig. 2) is supplied to simplify the construction of this unit. To permit mounting this antenna plane to the tripod, drill a 1/4" diameter hole. This hole is located about 5" from the center and on a radial parallel to one edge.

3. CONNECTIONS

The Remote Vertical Antenna has two BNC terminals, one marked with a red dot and one with a green dot. Connect one end of the pair of 30 ft. coaxial cables supplied with the NF-105 to the VR-105. Match the color code on the cable connector to the color code on the VR-105 connector. To complete the connections to Tuning Unit TX/NF-105 refer to Fig. 3 (page 6) of Instruction Manual.

4. OPERATION

Refer to Instruction Manual for Tuning Unit TX/NF-105.

Radiated broadband measurements may be made more easily and with greater accuracy using the series method of calibration. In this system the IMPULSE GENERATOR calibration signal (reduced 20 DB) ? (INCREASED) is injected in series with the signal intercepted by the vertical antenna.

The antenna signal and the impulse generator signal see the same high input impedance of the matching coupler located in the base of the VR-105 antenna. Therefore, if the voltage measured at the output of the matching coupler is the same for either the antenna signal or the impulse generator signal, then the amplitudes of these signals are equal.

Connect the VR-105 antenna to the TX/NF-105 as indicated in the above paragraphs. Set the IMPULSE GEN. on the tuning unit to OFF. Set the function selector switch to the PEAK position. Tune the receiver to the incoming RF signal under measurement and adjust the SIGNAL INPUT ATTENUATOR control and the IF GAIN control to obtain a reference indication on the meter (10 DB). Turn off the source of the incoming RF signal. Set the IMPULSE GEN. ON-OFF switch to ON. Adjust the IMPULSE GEN. OUTPUT dial settings to obtain the same reference reading on the meter (10 DB). The level of the radiated RF signal in DB above 1 uV per megacycle of bandwidth is the sum of the DB levels indicated by the IMPULSE GEN. OUTPUT dial settings minus 20 DB. This 20 DB constant is the result of the inherent attenuation of the series injection network. See schematic diagram, fig. 3.

If the RF signal being measured can not be turned off, it is still possible to complete the measurement by employing the following procedure. Adjust the IMPULSE GEN. OUTPUT dial settings until the meter indicates a 1 DB rise in output above the reference reading produced by the radiated RF signal under measurement. The level of the incoming RF signal is then the IMPULSE GENERATOR level minus 21 DB.

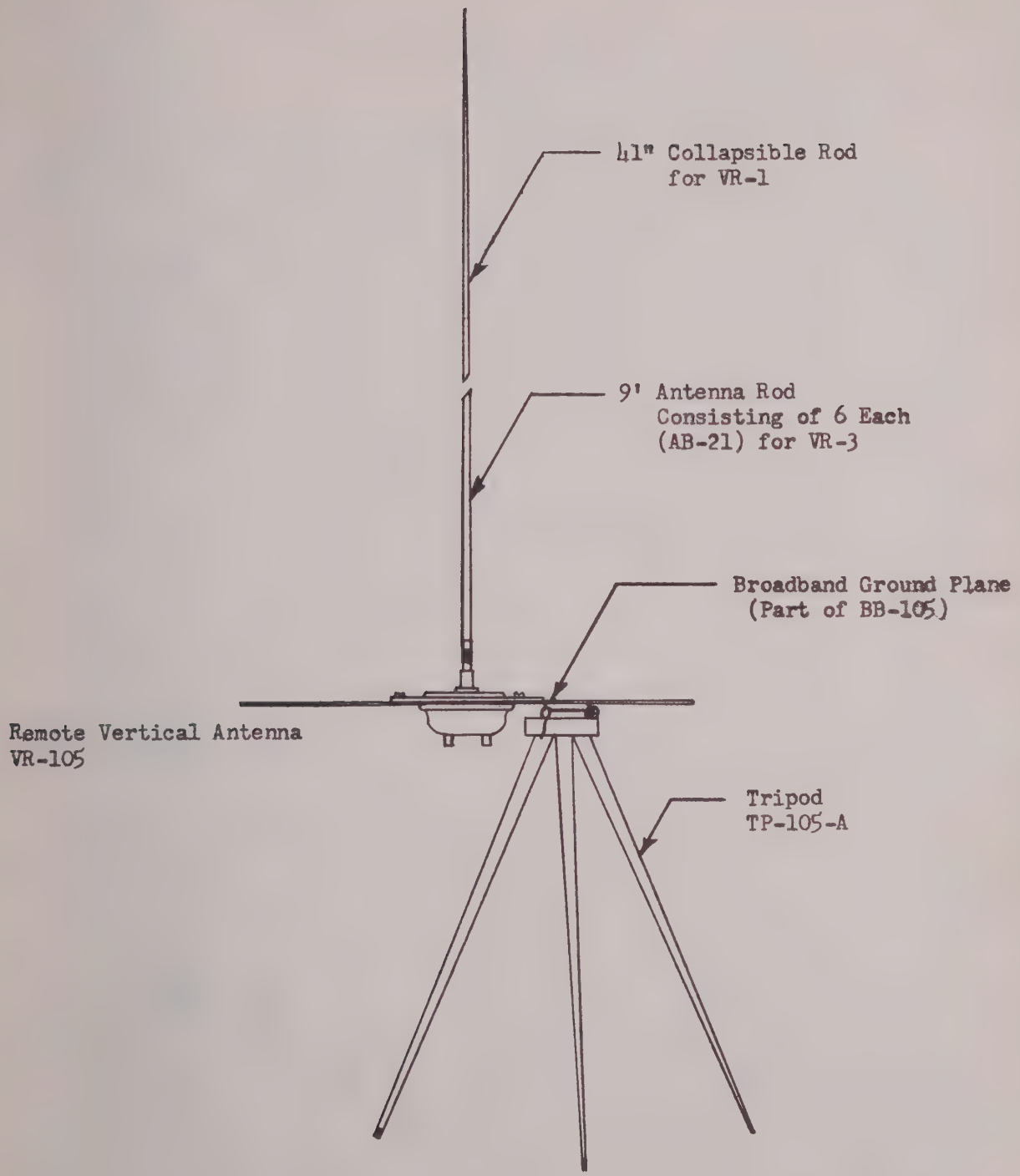

FIG. 1
INSTALLATION
OF
REMOTE VERTICAL ANTENNA
VR-105
VR-205

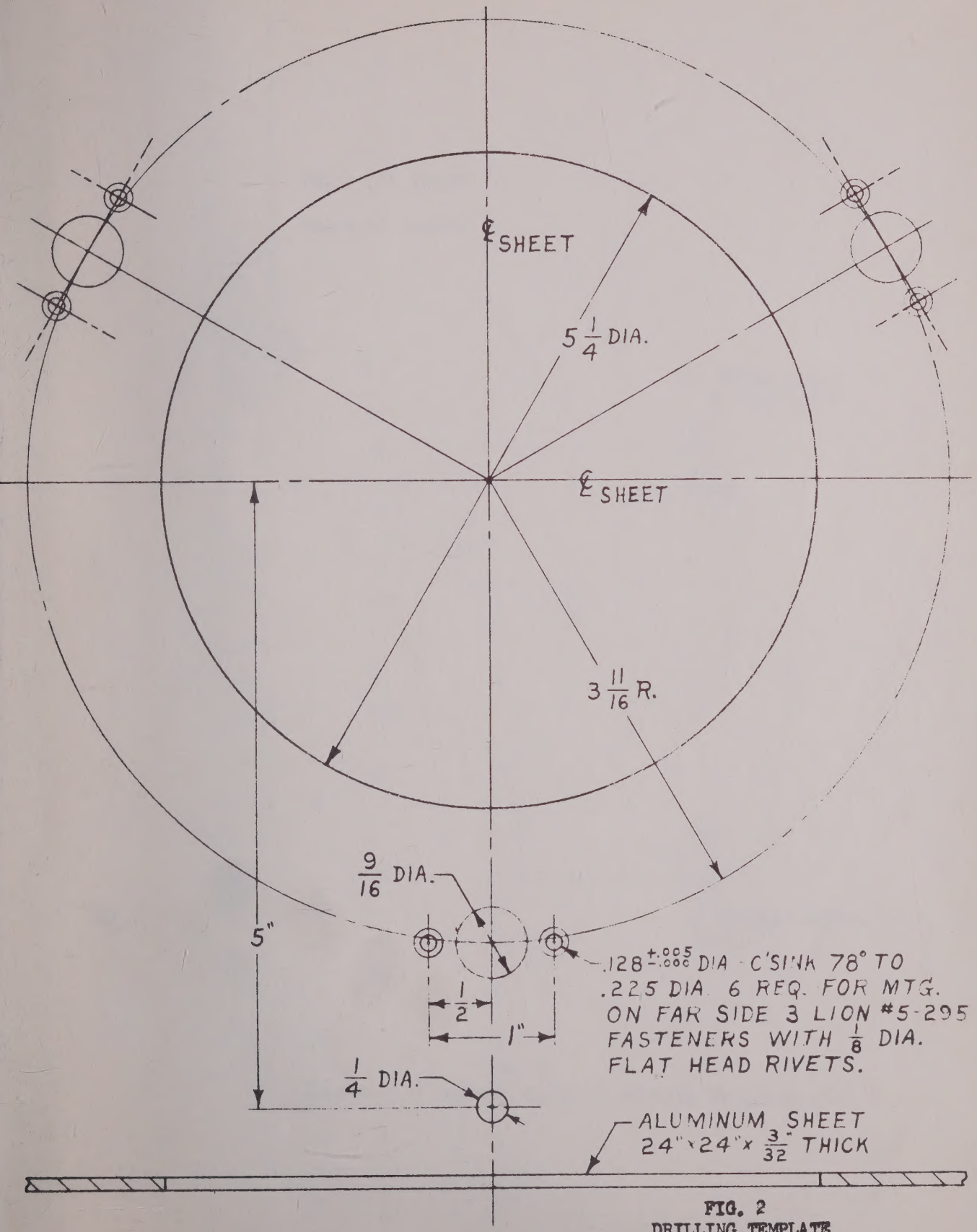
℄ SHEET
5 1/4 DIA.
℄ SHEET
3 11/16 R.
9/16 DIA.
5"
.128 +.005 -.000 DIA C'SINK 78° TO .225 DIA 6 REQ. FOR MTG. ON FAR SIDE 3 LION #5-295 FASTENERS WITH 1/8 DIA. FLAT HEAD RIVETS.
1/2
1"
1/4 DIA.
ALUMINUM SHEET 24" x 24" x 3/32" THICK

FIG. 2
DRILLING TEMPLATE
FOR
FABRICATED GROUND PLANE

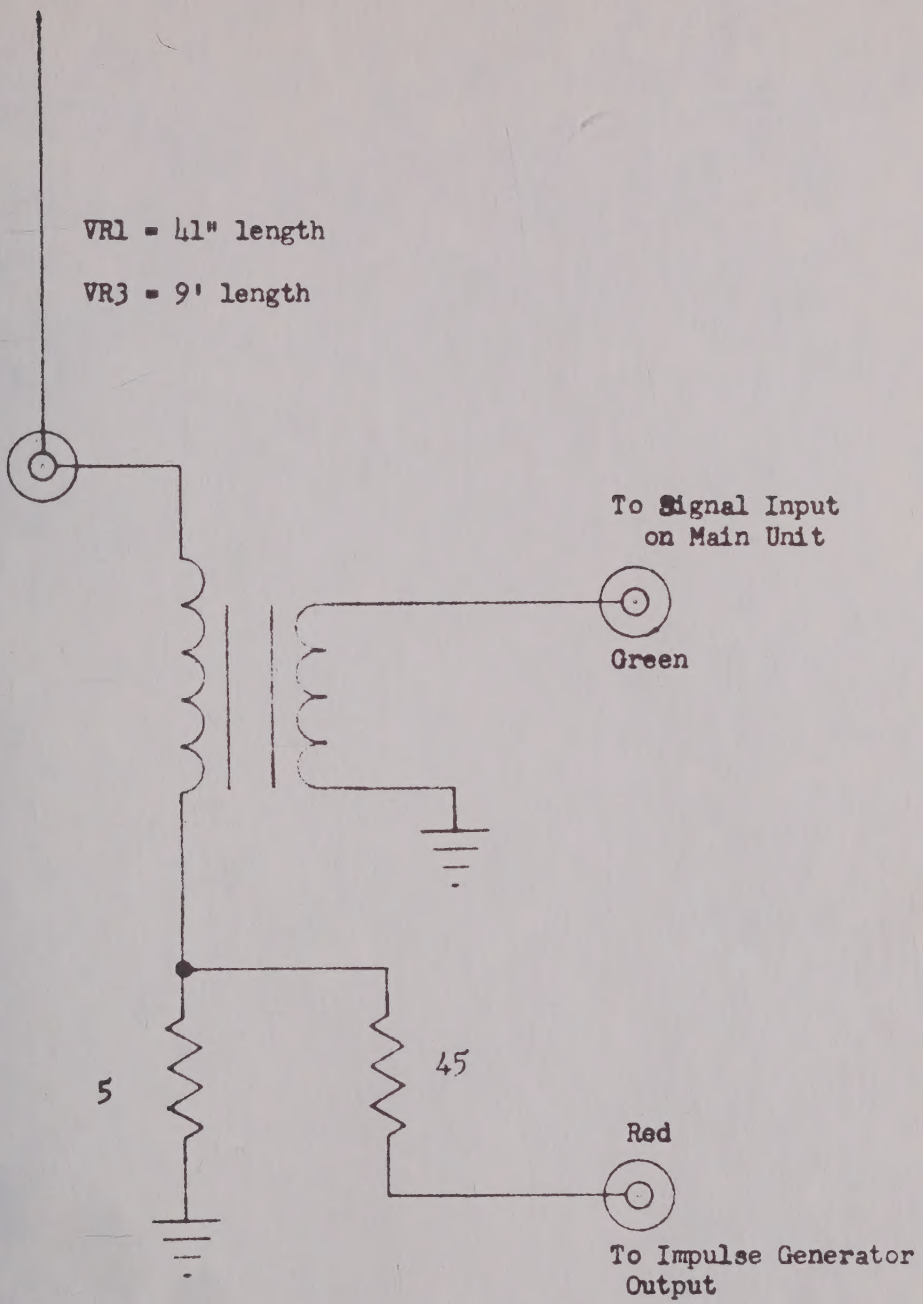

FIG. 3
SCHEMATIC - REMOTE VERTICAL ANTENNA VR-105, VR-205